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GEOGRAPHICAL RECORD

AMERICAN GEOGRAPHICAL SOCIETY

Monthly Meeting of November. A regular monthly meeting of the American Geographical Society was held on Tuesday evening, November 20, at the Engineering Societies' Building, 29 West Thirty-ninth Street. President Greenough presided. He submitted for confirmation the names of 406 candidates for Fellowship, each of whom had been approved by the Council, and they were confirmed as Fellows of the Society. Thereupon Mr. Donald B. MacMillan, leader of the Crocker Land Expedition, delivered a lecture entitled ''In Search of New Arctic Lands.'' He first gave a general account of the expedition, the activities of which have been frequently reported in these pages (*Bull. Amer. Geogr. Soc.*, Vol. 47, 1915, pp. 52-53 and 535; *Geogr. Rev.*, July, 1917, pp. 62-63, and October, 1917, pp. 320-321) and then dwelt more particularly on his various journeys during his four years in the Arctic. Among other things he reported the resurvey of the southeastern coast of Ellesmere Island and the discovery of several large glaciers, one of which he named the American Geographical Society Glacier. It is one of the major streams of ice by which the ice cap discharges into the sea. Mr. MacMillan's lecture was illustrated by excellent lantern slides and by motion pictures. The latter included a remarkable film showing the *Neptune*, the third relief ship of the expedition, pushing its way through the extraordinarily heavy ice of 1917.

NORTH AMERICA

Artificial Flood on the Ohio River as an Aid to Transportation. With the destructive floods of nature the Ohio Valley is unhappily too familiar: in August last was recorded a new kind. This was an artificial flood created to demonstrate the strategic use that might be made of the river even during the dry season, when it is normally closed to boats exceeding two feet in draught. The opening of dams on the upper waters produced a crest of three to six feet. On it were carried to Cincinnati 13,000 tons of coal, an amount that would have required 350 cars for rail transit (*Commerce Repts.*, Aug. 29, 1917).

Flood Control of the Miami River, Ohio. To prevent the recurrence of such disastrous floods as that of March 22-27, 1913, in Ohio, engineers have planned an elaborate system of control over the run-off in the drainage basin of the Miami River, one of the areas most disastrously affected (The Miami Valley Flood-Protection Work, *Engineering News*, Jan. 4, 1917, pp. 12-17; Jan. 11, pp. 62-65; Jan. 25, pp. 144-151; Feb. 1, pp. 186-188). A study of storm records has convinced them that combinations of meteorological conditions have rarely, if ever, been more unfavorable than on that occasion, and that there is no probability of greater floods in the future. As was pointed out by R. M. Brown (The Ohio River Floods of 1913, *Bull. Amer. Geogr. Soc.*, Vol. 45, 1913, pp. 500-509), a heavy southwest storm followed close upon one from the northwest, both coming when the ground was already well saturated. An average of eight inches of rain fell in the Miami valley within five days. The consequent run-off was enormous. Plans at first were contemplated for channel improvement on a large scale, but the engineers soon became convinced that retarding basins would be the only means of securing absolute safety. The fan shape of the drainage basin tends to produce sudden floods that would be liable to overflow any levees constructed. Five large retarding basins are now being built in such a way that even the farm lands within their area may be utilized and will be in danger of flood only under exceptional conditions.

A Botanical Survey of British Columbia. In 1911 there was organized at Vancouver the Botanical Office of British Columbia. The work is under the direction of John Davidson, F.L.S. Three annuals reports—for 1913, 1914, and 1915—have already been published. These describe botanical explorations in two regions hitherto even topographically not well known. The first and second reports (*First Annual Rept.*, pp. 17-21; *Second Annual Rept.*, pp. 50-74) deal with the Mt. Garibaldi region of the southern Coast Range. Mt. Garibaldi is a peak 8,700 feet high on the dividing crest between the Cheakamus and Lillooet Rivers and lies in about 49° 55′ N. and 122° 50′ W. The botanical work was carried out in connection with a trip by the British Columbia Mountaineering Club of Vancouver, whose president, Mr. W. J. Gray, made a very creditable survey of the region, a map of which on the scale of 1:50,000 accompanies an article by himself and H. Samson on ''The Garibaldi Group'' in a publication of the club entitled "The Northern Cordilleran" (Vancouver, B. C., 1911, pp. 25-32) and reprinted in the *First Annual Report of the Botanical Office of British Columbia, 1913* (Victoria, B. C., 1914). The map embraces a stretch of territory some ten miles north of the peak and eight miles wide from east to west, including a hitherto unmapped alpine lake four miles long and 4,600 feet in elevation, named Garibaldi Lake. The botanical features noted exhibited the usual alpine habitus. Immediately below the tree line the slopes are often wooded, *Abies amabilis* (Forbes) and the mountain hemlock (*Tsuga mertensiana*) being the characteristic trees. With regard to the latter an interesting ecological observation was made. As a consequence of the continued browsing of mountain goats or sheep, the basal shoots of the trees of this species by repeated branching had formed an impenetrable thicket several feet in diameter around each tree until the center was beyond the reach of the animals; the central part then grows erect and is more or less normal.

The second region in which botanical observations were made is the eastern side of upper Skagit valley north of the United States boundary (see *Third Annual Rept.*). This trip also resulted in the correction of topographical details. All the principal creeks of the eastern side of the valley were ascended or descended, and the divide between the Skagit River (121° W.) and the South Similkameen River was found to lie farther east than supposed, at one point by as much as 8 miles.

Weather and the Amount of Cotton Ginned. An investigation of the relation of the weather to the amount of cotton ginned during certain periods has been carried out by J. B. Kincer of the Weather Bureau (*Monthly Weather Rev.*, Vol. 45, 1917, pp. 6-10). It appears that a forecast of the size of the cotton crop, based on the ginning reports, has a much greater value when consideration is given to the influencing weather factors than when the reports alone are considered. If temperatures during the critical months of growth are high and the weather is favorable for picking during the period covered by a given early ginning report (say Sept. 1-25), the percentage of the total crop ginned during the period may safely be considered as much in excess of the average, and the final yield less than that apparently indicated by the actual amount ginned to that date. Two weather factors, operating separately and independently of each other, largely control the relative amount of cotton ginned from year to year during a given ginning period, and also that ginned during the several periods of any single year. These factors are the temperature conditions during certain early months of the growing season (principally May-June) and the amount of fair or rainy weather during the ginning period itself. In studying early ginning reports, temperature has the controlling influence, but later, say for the period September 25-October 18, the amount of fair weather during the period itself takes precedence. The whole subject is one of great practical importance and illustrates the economic advantages which are to be derived from careful study of meteorological records. R. DeC. Ward.

Adaptation to Environment in Building the Cities of the Canal Zone. Describing the towns built by the American Government in the Canal Zone, Mr. Seymour Paul shows in a recent article (American Cities in the Tropics, *The South American*, September, 1917, pp. 14-15) how they have been adapted to the peculiar conditions prevailing there. Projecting roofs give shelter from rain and sun. Eaves gutters are not used because they would soon fill with leaves. Good drainage is important, even the sidewalks being constructed in the form of flat troughs to facilitate run-off. Low pillars raise the houses a few feet above the damp ground and provide more complete ventilation. Level building sites are avoided. The hill sides afford better drainage as well as freer air circulation. Screens are used on all doors, windows, and the wide porches characteristic of warm climates. Copper wire only can be employed in the screens. Interior fittings must be made of bronze or brass. Wood rots so rapidly that concrete buildings are more economical. Ants, too, destroy the woodwork, the hardest oak becoming honeycombed in a few years. A frame house will last only from ten to twenty years at best. Wooden structures withstand earthquake shocks well but concrete reinforced with steel has proved sufficiently pliable for the usually light "tremors" felt at Panama. The natural desire to build towns like those in the "States" has had to yield to the geographic environment.

SOUTH AMERICA

A New Theory of the Origin of the Chilean Nitrate Deposits. Few, if any other, surface deposits have given rise to so much discussion as the nitrate deposits of northern Chile. Because they are unique in extent and importance, their origin has interested scientists for three-quarters of a century. Many theories of origin have been advanced, but none of them has been generally accepted. Several recent contributions to the discussion are noteworthy, because of the new aspects presented.

A paper by J. T. Singewald, Jr., and B. LeR. Miller (*Econ. Geology,* Vol. 11, 1916, pp. 103-114) has already been noticed (*Geogr. Rev.,* Vol. 2, 1916, pp. 465-466) but is here treated more extensively in order to do justice to the subsequent discussion it evoked. The paper points out that all the theories of origin depend on methods by which nitrates can be readily found, but not all the conditions postulated for such methods are supported by the facts from the Chilean fields. For purposes of discussion the various theories are grouped, according to sources and processes involved, under the four heads: seaweed theories, guano theories, bacterial theories, electrical theories. A brief consideration of arguments for and against the several ideas leads to the general conclusion that the evidence is insufficient to establish proof of the operation of any one of them. The authors then advance their idea that the deposits are the result of efflorescence from ground-water, the minute nitrate content of the underground water being accumulated as a result of evaporation.

The geography of the region is held largely responsible for the effectiveness of this process. Extreme aridity, strong insolation, barren surface, high water-table, and the loose, porous, detrital material composing the *pampa,* all combine to favor effective capillarity, active evaporation, and hence ready accumulation of soluble salts from ground-water. Since all underground waters carry some nitrate, ''abnormal conditions of extreme aridity and shallow ground-water suffice to explain, in large measure at least, the unusual accumulations of nitrates that have taken place'' in northern Chile. If the same conditions were duplicated elsewhere similar deposits would result.

The formation of nitrates is not peculiar to Chile, for they are being generated by well-known processes all over the surface of the earth. Northern Chile may be unique in the generation of nitrates in that more of the nitrate-forming processes have been active there than is generally the case. But, the authors contend, all the processes combined would be inadequate to account for the great amounts of nitrate, ''if it were not for the all-important, remarkable conditions of climate, underground waters, and geologic structure existing in the region.'' The real problem, therefore, lies not in determining the mode of formation of the nitrates, but in explaining the conditions which have made possible their accumulation.

The localization of nitrate deposits in restricted areas along the western edge of the *pampa,* most commonly around the *salars,* is quite in keeping with the nature of the substance. If salt and nitrate were accumulated in the depressions, the nitrate would tend to creep out by efflorescence to the dry ground around the boundaries of the *salars.* This process would go on most actively where the ground-water comes nearest the surface, as it does toward the western edge of the *pampa,* and it would reach its maximum where a particularly porous area exists. Thus, ''irrespective of how minute a quantity the original ground-water carries,'' this process, ''long-continued, will lead to accumulations of large deposits of sodium nitrate.''

Objections to this explanation of nitrate occurrences are raised by Lorenzo Sundt (discussion of Singewald and Miller's paper, *Econ. Geology,* Vol. 12, 1917, pp. 89-96) on the basis of long experience in the nitrate region. In Taltal, for example, topographic conditions are quite different from those in Tarapacá, where Singewald and Miller made their studies. Isolated ranges interrupt the slope from the Andes toward the coast mountains, in such a way that underground waters could not travel far. Nitrate deposits, however, are found on the slopes and even on the summits of isolated, flat-topped hills, where it would seem impossible for the supply to have any other origin than *in situ,* with the source of the nitrate in the atmosphere and the source of the soda in ''decomposing feldspathic porphyrites.'' The absence of deposits in most of the width of the *pampa* is due to the absence of this porphyritic material. Sundt also states that the ground-water theory is inadequate because ''there are extensive nitrate terranes in which wells eighty meters deep have not encountered ground-water.''

In answer to Sundt's criticism, Singewald and Miller note that the absence of nitrate from many areas where feldspathic rocks are present is a serious weakness in any theory of origin based on that factor. Moreover, their original contribution was not to explain the *mode of formation* of sodium nitrate, but rather to account for the *manner of the localization* of the deposits. And the fact remains that the largest and most important deposits are related to ground-water in the manner called for by their theory. In those places where no such relation exists, diastrophic changes may have altered the ground-water level since the deposits were formed. WALTER S. TOWER.

Vital Statistics of the Indians of Eastern Bolivia. A parish register is a somewhat unusual document to lay before a student of geography: it is from a source so unique that Baron Erland Nordenskiöld derives his interesting article ''Die Bevölkerungsbewegung unter den Indianern in Bolivien'' (*Petermanns Mitt.*, April, 1917). During his expedition of 1913-14 Nordenskiöld visited the mission among the Mostenes at Covendo on the upper Rio Beni. From the priest's records, supplemented by verbal information, he has derived a series of vital statistics. To them have been added others from similar sources elsewhere in eastern Bolivia—recent figures from the Guarayos and Chiriguanos missions (for location of these tribes see the map accompanying Baron Nordenskiöld's paper ''The Guarani Invasion of the Inca Empire in the Sixteenth Century'' in the August number of the *Review*) and the data gathered by d'Orbigny in his travels to the Mojos and Chiquitos missions in the earlier part of the last century. Fragmentary and imperfect as all these records must be, they nevertheless have a distinct value in showing the general demographic movement among the uncivilized tribes peopling a vast area.

Among these Bolivian Indians the birth-rate is high. In Covendo, for instance, between 1897 and 1912, when no epidemic occurred, the birth-rate was 83 per thousand. The average woman of the tribe bore eight children. Among the Guarayos (1912-15) it was 69 per thousand, a figure recorded by d'Orbigny for the Mojos and probably acceptable as an average. Twins are unusual and the number of children stillborn or deformed is very low. On the proportion between the sexes at birth it appears to be impossible to generalize, but among the majority of these tribes the men exceed the women. Probably the latter succumb more easily to the hardships of the savage life and possibly child-murder eliminates a greater proportion of the female sex. Marriage takes place at a very early age, and all mature Indians are married or have been married. The Indian quickly reaches old age: an individual old in years is unusual; the oldest Indian in Covendo was only 56 years old. Normally the death-rate is considerably inferior to the birth-rate. Infant mortality, of course, is very high. In the last two decades recorded in Covendo out of 240 children born 77 died during the first year. But it is the epidemics that cause the heaviest mortality, and smallpox transmitted by Indians from the plateau works the worst havoc. In 1886 it carried off over one-third of the population of Covendo, dealing them a blow from which they have never recovered.

The Uruguayan Meteorological Service. Much attention has been called to the valuable work accomplished by the Argentine Meteorological Office. Less conspicuous but very important have been the observations carried on in Uruguay. The latter country forms a distinct meteorological district, for its climate is modified by the wide estuary of the La Plata as well as by oceanic influence. It differs from the Brazilian coast in being farther removed from tropical conditions, and from Paraguay in the diminished continental character.

The Instituto Nacional Físico-Climatológico was founded in 1905. Its function is primarily climatological, as weather forecasting is done by the Instituto Nacional Meteorológico. Observations have been made for many years in the central observatory in Montevideo and other private institutions. The name of Luis Morandi, present director of the climatological institute, figures in most of the studies undertaken since 1888. The institute publishes a *Boletín Mensual,* now in its fifteenth year. Three hundred and forty-four stations report to it and railroads and packing companies co-operate. In each bulletin there is given an extract of the daily observations during the month. These afford a very good idea of the prevailing weather. The usual tables of data are included in the bulletin, but there are no maps nor other graphic representations. The institute has recently published a pamphlet summarizing and discussing the data obtained in the observatory during the last fourteen years (Luis Morandi: Resumen y discusión de las observaciones meteorológicas del Observatorio Central, período 1901-1915, Montevideo, 1917).

The Unique Currency of Nariño, Southern Colombia. The Republic of Colombia has issued a decree recalling the national silver coined before 1911 and the foreign money now in circulation. Conversion is to be effected by the Exchange Office in Bogotá and ''such other exchange offices as the Government may deem it necessary to establish in the Department of Nariño and the Intendency of Chocó'' (*Board of Trade Journ.*, June 28, 1917). The last statement is geographically interesting. In respect of Nariño it indicates a tussle anticipated by the Government. The peculiar monetary situation of Nariño has lately been described by A. C. Veatch in his ''Quito to Bogotá'' (New York, 1917). Nariño, the most southerly department of Colombia, is isolated by poor communications from the central Government. Its self-contained mountain basins shelter an independent people who care little for affairs beyond their own boundaries. Their obstinate provincialism finds expression in their singular currency. When the remainder of the republic adopted a gold basis Nariño refused to conform and enforced a local silver standard. It accepts at silver value coins of all nations and dates and hence has become a happy depository for coins no longer current elsewhere. The most abundant coins are said to be the old 8-*reales* pieces of the first years of independence, but the currency as a whole is extraordinarily heterogeneous.

ASIA

The Physical Foundations of Babylonia. Babylonia owes its ancient fertility to the alluvium of two mighty rivers. The cities and towns which once covered this alluvial plain were products of the twin river basin. Many features of this basin proved favorable to humanity. The banks of the Euphrates were conveniently low so that the Babylonians found in them starting points from which to extend a system of canals to distribute far beyond the river the rich silt of its waters. This section of western Asia is one of scanty rainfall. The dependence of the inhabitants on the rivers was thereby increased.

An able sketch of these physical foundations has lately been presented by Professor A. T. Olmstead in a study entitled ''The Political Development of Early Babylonia'' (*Amer. Journ. of Semitic Languages and Literatures,* Vol. 33, 1917, pp. 283-321). He shows that the two rivers with their network of canals formed an irrigation unit which pointed to political union. A further cause that led to Babylonian unity was the pressure of the nomads from the deserts on the west and southwest. The slightest drought would send these raiders against the inhabitants of the irrigated lands. The only adequate protection against these encroachments lay in the political union of the settled population. The danger was all the greater because of the absence of natural frontiers in Babylonia. The steppe merges into the alluvium without marked transition save for a very low escarpment on the north and northwest.

Various conditions did not promote enterprise among the Babylonians. The climate with its seven months of intense heat bred indolence among them. The extraordinary fertility of the soil provided ample supplies of food, and the impulse to go forth in search of necessities was rarely felt. The country became a prey to the sturdier races of the mountains in Upper Mesopotamia or of the western edge of the Persian plateau. The Semitic invaders from the west or southwest likewise found in Babylonia a people lacking in energy. For a while superior civilization enabled the Babylonians to withstand the pressure of barbarian foes. Eventually, however, the empire failed in its resistance.

The Typhoon Warnings of the Zikawei Observatory, Shanghai. A late summer day in the China Seas—clammy heat, thick air under a leaden sky, an ever-increasing swell of the oily waters and presently a falling barometer: the ship's log records an approaching typhoon. If the track of the storm cannot be escaped then will follow an experience of thrilling adventure. Innumerable logs relate the bare facts of such adventures, and these alone stir the imagination, but the typhoon is fortunate in having an exceptional chronicler (Joseph Conrad in his novel ''Typhoon''). If you would realize the incredible force of the tropical storm follow the course of the *Nan Shan* from the moment that the storm descended ''formidable and swift, like the sudden smashing of a Vial of Wrath,'' engulfing the ship in a fury of air and water until she reaches the ''sinister'' calm of the center, the eye of the storm. An actual example of such a storm occurred as late as August, 1917. The *Army and Navy Journal* of October 6 (p. 188) publishes an account by Captain C. H. White, U. S. A., of the typhoon encountered by a United States transport from the Philippines when northeast of Formosa. The transport passed through the eye of the storm, ''a lull with no air stirring and a calm sea with the barometer falling with nearly a perpendicular curve.'' The lowest pressure recorded was 27.98 inches, and the wind beyond the calm had an estimated velocity of between 125 and 130 miles an hour.

No part of the sailing routes of the Eastern Seas between Japan and the Philippines is free from these whirling storms, but in most instances a ship may escape fatality or serious damage if duly warned. A miscalculation lost the P. and O. liner *Bokhara* in the dangerous Pescadores Channel off the west coast of Formosa during the typhoon of October, 1892: knowledge of the locus of the storm center would have saved her (W. Kesslitz and K. Rössler: Maritime Meteorologie, Pola and Fiume, 1904, p. 125 and Fig. 14). It is to meteorological service that we look for such warnings. How a meteorological service can render invaluable assistance in safeguarding against tropical storms has been proved in the West Indies by the complete system of cable-reporting meteorological stations established by the United States since 1898. But the conditions which favor the development of the hurricane in the West Indies are still more favorable to the development of the typhoon in the Philippines. Doberck finds that, where, in the former, the storms average two a year, in the latter they average 19 (W. Doberck:

The Law of Storms in the Eastern Seas, 4th edit., *Hongkong Observatory Publ. No. 3*, Hongkong, 1904): moreover the storm-swept area is greater in the East than in the West. In the Philippines the meteorological system established at the same time as that of the West Indies has done important work. Farther north in the typhoon belt great honor is due to the labors of the Zikawei Observatory. The following account is based on a communication kindly sent to this Society by its present director, Father H. Gauthier, S. J.

Zikawei lies on the alluvial plains of the Yangtze-Kiang, 45 miles from the sea. Zikawei is one of many notable observatories founded and directed by the Society of Jesus. Another is the Central Observatory of Manila, under state patronage but still directed by members of the order. The Manila observatory has published several contributions to meteorology. Of them F. José Algué's ''The Cyclones of the Far East'' (Special Report of the Philippine Weather Bureau, 2nd edit., 1904) is the most valuable relative to the topic under discussion. Zikawei began its regular series of observations in 1873 under the direction of M. Dechevrens. Very shortly the observatory became known for its research work in the various departments of physical science for the study of which it was equipped—astronomy, terrestrial magnetism, meteorology, and, later, seismology. Not only were the studies of high theoretical value: they had direct practical bearings, especially those in meteorology. Naturally the tropical storm received attention from the first. As the present director remarks: ''The study of cyclones which visit the mouth of the Yangtze was, in a special manner, forced upon a meteorological observatory established at Shanghai.''

Publication of ''The Typhoon of July 31, 1879'' by M. Dechevrens created a tremendous impression among the merchants of Shanghai, and it may be said to mark the entry of the observatory into direct public service. The observatory commenced to furnish the local papers with weather reports, and the establishment of a typhoon signal service was discussed and voted for by the International Chamber of Commerce. In 1884, supported by the potent Chinese Maritime Customs, the service came into operation: a signal mast was erected on the borders of the French and the International Concessions, and it has functioned uninterruptedly ever since. To Zikawei as a center were sent observations from neighboring meteorological stations, and reports came from sea captains and other observers. Today there has been built up a complete network for the protection of China's coasts. Some of the co-operating stations are far distant, that of the Carolines, for instance, is 1,200 miles from Luzon. The code employed at Zikawei proved generally acceptable. In 1898 Sir Robert Hart introduced it into all the seaport stations under the Chinese Maritime Customs, and its merits were endorsed by W. F. Tyler, Inspector General of the China Coasts. ''The principle at Zikawei is to keep the seaman well posted by supplying him with every information in hand. The position of a typhoon is signaled to him with precision as well as the direction it has followed, its course is observed, and every change of direction or of position is announced without delay.'' Today the code is being modified; a system of symbols will permit the mariner the necessary information without resource to any conventional code.

The meteorological data collected by the observatory are published in regular bulletin form and from time to time are made the subject of special memoirs. Many naturally pertain to typhoons, but on other meteorological topics there are such important papers as F. de Moidrey's ''Notes on the Climate of Shanghai'' (1904) and L. Froc's ''La pluie en Chine durant une période de onze années, 1900-1910'' (1912; reviewed in *Bull. Amer. Geogr. Soc.*, Vol. 46, 1914, p. 380).. Besides contributing to our knowledge of a particular region, one, too, of great commercial interest, the problems dealt with in Zikawei are contributing to the progress of our comprehension of the general physics of the atmosphere.

AUSTRALASIA AND OCEANIA

Completion of Australia's First Transcontinental Railroad. The building of a transcontinental railroad must always rank as a notable achievement, and doubly so must be reckoned the completion in war-time of Australia's first transcontinental line (*Munsey's Magazine*, August, 1917, p. 510; cf. also *Board of Trade Journ.*, June 28, 1917, p. 710). The systems in the east and the west are now united along the southern edge of the continent by the link between Kalgoorlie, West Australia, and Port Augusta, South Australia, and today the traveler can go from Perth to a point in Queensland in 19° south latitude (Townsville) 4,000 miles by continuous rail journey. The connecting link measures over 1,000 miles. Throughout its length until Port Augusta is reached it traverses a country with an average annual rainfall of under 10 inches. For long stretches potable surface water is absent save for an occasional temporary rock hole or soak. Such is the case for the first 180 miles out of Kalgoorlie, where, moreover, borings have failed to prove the existence of underground water and the railroad is dependent on meteoric waters stored in great reservoirs built to hold several million gallons (Chas. G. Gibson: The Geological Features of the Country Lying Along the Route of the Proposed Transcontinental Railway in Western Australia, *Geol. Survey of W. Australia Bull. 37,* 1909). When the sand-buried granitic terrain, with its characteristic desert vegetation of spinifex and mallee, is left for the limestone country to the east, the question of water is somewhat ameliorated. By sinking bores to a sufficient depth, water, albeit sometimes brackish, is always obtainable. Level, treeless saltbush plains characterize the limestone: they offer definite pastoral possibilities. Beyond the limestone the railroad runs through a belt of ancient auriferous rocks. The gold and copper of Tarcoola have been in exploitation for some time, but the mineral potentialities of the entire belt are little known: the prospects are said to be good. From Tarcoola the line runs southeast through occupied pastoral country to Port Augusta at the head of Spencer Gulf. The line will be of the greatest service in the expedition of passengers and mail. It adds to the unity of the Commonwealth and provides an important measure of strategic defense.

HUMAN GEOGRAPHY

Sunshine in Its Relation to City-Planning. The importance of the angle of sunshine, of exposure to sunshine, and of the varying intensity of insolation at different latitudes in their effects on problems of public health, municipal expenditures, etc., is strikingly brought out by Messrs. H. S. Swan and G. W. Tuttle in an article entitled ''Planning Sunlight Cities'' (*The American City,* Sept. and Oct., 1917, New York). Emphasis is laid on the need of scientific determination of optimum building heights, street widths, and street orientation. Shadows cast by tall buildings deprive great areas of needed sunlight. The Woolworth Building in New York, 791 feet high, casts a shadow 1,635 feet long at noon on December 21. The Equitable Building, 493 feet high, casts a shadow 1,018 feet long, covering 7.59 acres, on the same date. Tables are presented showing in great detail the sunshine period at ground level of streets, for different latitudes, and for each side of streets of different orientations improved with buildings of various heights. Thus Winnipeg, Canada, has on December 21 only two-thirds the equatorial duration of sunshine. For direct sunlight to reach the north curbs of east-west streets at noon, the buildings on the south sides of the streets would have to be only three-tenths as high as the streets are wide. At the equator on the same date a height equal to 2.31 times the street width is possible. The attainment of ideal sunshine conditions for east-west streets would obviously lead to economically impossible relations of street width to building height. The problem does not concern so vitally the location of detached houses; here the requisite sunlight can ''be purchased more cheaply on an east-west street than on a north-south street.'' In the case of city blocks of attached dwellings, the conclusion is reached that such blocks should have their longer dimension on north-south streets only. East and west fronts thereby receive equal amount of sunshine. The number of east-west streets need be determined simply on the basis of traffic requirements, as the length of blocks north and south has no effect on the amount of sunshine received. These east-west streets have their sunshine conditions least affected at low latitudes, but at high latitudes the north side of the street becomes nearly, if not quite, as undesirable as the south side. The fullest possible utilization of diffuse daylight by means of large windows is important in this connection. The north-south orientation of streets would allow the most economical use of the land (by permitting buildings of equal height on both sides of the street) and would make possible the maximum practicable use of the sunshine received at a given latitude. ''What is needed for the promotion of good housing today quite as much as restrictive regulations is the definition of scientific standards which will directly relate height and area provisions to the minimum requirements of public health.''

B. M. VARNEY.

GEOGRAPHICAL NEWS

PERSONAL

MR. THEODOOR DE BOOY of the Museum of the American Indian, Heye Foundation, of New York, gave a lecture on November 7 before the Geographical Society of Philadelphia on ''The Virgin Islands.''

DR. SALVADOR DEBENEDETTI has been appointed director of the Ethnographical Museum of the University of Buenos Aires and chief of its archeological expeditions, to succeed Dr. Juan B. Ambrosetti, who died on May 28.

PROFESSOR O. D. VON ENGELN of Cornell University addressed the Physiographers' Club of Columbia University on November 23 on "Types of Alaskan Glaciers and Features of the Associated Deposits."

MR. EARL F. CHURCH, who accompanied Dr. Hamilton Rice's Amazon expedition of 1916-17 as topographer, has, with other members of the personnel of the U. S. Coast and Geodetic Survey, been transferred by executive order of September 24 to the service and jurisdiction of the War Department with the grade of First Lieutenant, U. S. R.

DR. E. O. HOVEY of the American Museum of Natural History read a paper on November 19 before the New York Academy of Sciences on "The Geology of the Greenland Coast from North Star Bay to Cape York."

DR. ELLSWORTH HUNTINGTON gave a lecture on October 26 before the Geographic Society of Chicago entitled "The Turks and the Euphrates."

DR. OTTO KLOTZ, whose article on the history of the forty-ninth parallel boundary surveys in the May, 1917, number of the *Review* will be recalled, has been appointed Chief Astronomer and Director of the Dominion Astronomical Observatory at Ottawa, Canada.

PROFESSOR R. D. SALISBURY of the University of Chicago spoke on "Geography and Geology Work about Camp Grant," the National Army cantonment at Rockford in northern Illinois, at the Post-Vacation Luncheon of the Geographic Society at Chicago, on November 17.

DR. CARL SKOTTSBERG of the University of Upsala, Sweden, read a paper before the Torrey Botanical Club on November 13 entitled "An Account of a Visit to the Juan Fernandez Islands."

MR. EUGENE VAN CLEEF of the State Normal School of Duluth, Minnesota, addressed the Duluth members of Sigma Xi on September 25 on "Modern Geography and City Progress."

OBITUARY

DR. WILLIAM BULLOCK CLARK, state geologist of Maryland, died on July 27 at the age of 57. Dr. Clark had been at the head of the Maryland Geological Survey since its organization in 1896; professor of geology at Johns Hopkins University since 1894; and director of the Maryland Weather Service since 1891. From 1900 to 1906 he was commissioner for Maryland in the resurvey of the Mason and Dixon line. Dr. Clark's interests were wide, a breadth of view that is reflected in the wide range of related subjects which are represented in the publications of the organizations of which he was the head. His own writings of geographical bearing are: "The Physical Features of Maryland" (with E. B. Mathews; Part I of Vol. 6 of the reports of the Maryland Geological Survey, 1906) and "The Relations of Maryland Topography, Climate, and Geology to Highway Construction" (*ibid.*, Part II of Vol. 3, 1899).